



## *Vanilla tiendatii*, a new climbing orchid from Vietnam

Minh Ty NGUYEN<sup>1</sup>, Leonid V. AVERYANOV<sup>2</sup>, Van Huong BUI<sup>3</sup>, Nghia Son HOANG<sup>4,5</sup>, Van Son DANG<sup>4,5</sup>,  
Ba Vuong TRUONG<sup>4,5,\*</sup>

1. Application Development Institute, Thu Dau Mot University, 06, Tran Van On Street, Phu Hoa Ward, Thu Dau Mot City, Binh Duong Province. E-mail: tynm72@gmail.com

2. Komarov Botanical Institute of the Russian Academy of Sciences, Prof. Popov street 2, 197376, St. Petersburg, Russia. E-mail: av\_leonid@mail.ru

3. Vietnam National Museum of Nature, Vietnam Academy of Science and Technology, No. 18, Hoang Quoc Viet Road, Cau Giay District, Hanoi, Vietnam. E-mail: bvhuong90@gmail.com

4. Institute of Tropical Biology, Department of Biological Resources, Vietnam Academy of Science and Technology, 85 Tran Quoc Toan Street, District 3, Ho Chi Minh City, Vietnam. E-mail: dvsonitb@gmail.com

5. Graduate University of Science and Technology, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay District, Hanoi, Vietnam.

\*Corresponding author's email: bavuong2019@yahoo.com

(Manuscript received 20 May 2020; Accepted 30 August 2020; Online published 4 September 2020)

**ABSTRACT:** *Vanilla tiendatii*, discovered in limestone mountain area of Quang Binh Province in Northern Vietnam, is described as a species new for science. Morphologically this species appears to be closely related to *V. yesiniana* and *V. albida*, but well differs in the leaf shape, flower color, lip densely papillate-hairy at apex, and column fimbriate-hairy in the basal half. The key for identification of *Vanilla* species occurring in Vietnam is provided.

**KEY WORDS:** New species, Orchidaceae, plant diversity, plant taxonomy, *Vanilla*, Vietnam.

### INTRODUCTION

The genus *Vanilla* (Orchidaceae), described by Miller in 1754, belongs to subfamily Vanilloideae Szlachetko, tribe Vanilleae. It includes 100–107 species having pantropical distribution (Pridgeon *et al.*, 1999; Cameron, 2011). All species of this genus are terrestrial, lithophytic, or epiphytic climbers with thin or thick creeping stems. Flowers open in succession and short-lived. The sepals and petals are free and spreading; the petals abaxially usually with median keel; the trumpet-shaped, entire or 3-lobed lip is fused with column margin, with a disc with various ornamentation, such as keels, warts, trichomes or papillae-like hairs, rugose veins, and a dense tuft of many imbricate scarious scales; the fruit is a fleshy capsule or berry (Pridgeon *et al.*, 1999).

Previously four species of the genus were reported in the flora of Vietnam (Seidenfaden, 1992; Averyanov and Averyanova, 2003), i.e. *Vanilla albida* Blume, *V. annamica* Gagnep., *V. aphylla* Blume, and *V. siamensis* Rolfe ex Downie (= *V. pierrei* Gagnep.). Later, in 2011, L. Averyanov following the concept of Soto-Arenas and Cribb (2010) listed 3 species of *Vanilla* in Vietnam, i.e. *V. aphylla*, *V. yersiniana*, and *V. siamensis*, removing *V. annamica* Gagnep. and *V. somai* Hayata into the newly described genus *Miguelia* Aver., which presently includes three species in Vietnam - *Miguelia annamica* (Gagnep.) Aver., *M. cruenta* Aver. & Vuong, and *M. somai* (Hayata) Aver. (Averyanov, 2011; Averyanov and Truong, 2015). Additionally one species of the “true”

*Vanilla*, *V. atropogon* was discovered in Vietnam and described recently (Schuiteman *et al.*, 2013). The genus *Miguelia* Aver. is closely related to *Vanilla* but well differs in its inflorescence details, fertile bracts, and flowers with a carinate disc on the lip (Averyanov, 2011). In this paper we present the description of another new species of *Vanilla* s. str. with data on its floral morphology, ecology, phenology and relationship to allied species. The new species is illustrated by photoplate and photos of its habitat. With the newly discovered plant, the five species of *Vanilla* s. str. are now reported from Vietnam.

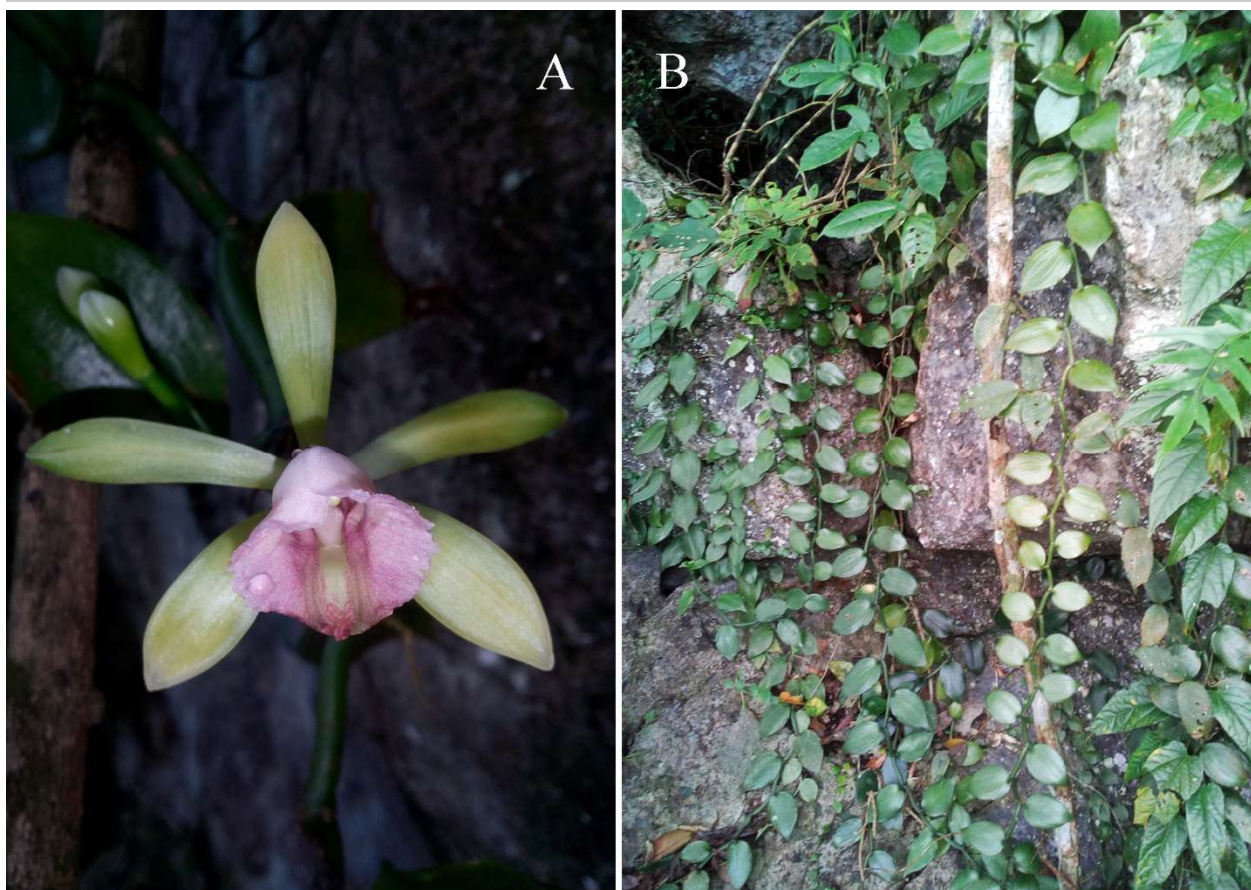
### MATERIALS AND METHODS

The measurements of plant organs and the description of the new species were based on living plants collected in the field in 2019. Besides herbarium voucher herbarium specimens, additional material was preserved in 70% ethanol and stored at VNM (Institute of Tropical Biology, Ho Chi Minh City). The morphological terminology follows Beentje (2012).

### TAXONOMIC TREATMENT

*Vanilla tiendatii* Vuong, V.H. Bui, V.S. Dang & Aver., *sp. nov.*

**Type:** VIETNAM, Quang Binh Province, Minh Hoa District, Trung Hoa Commune, limestone mountain forest, elevation 300–400 m a.s.l., 3 April 2019, *Truong*



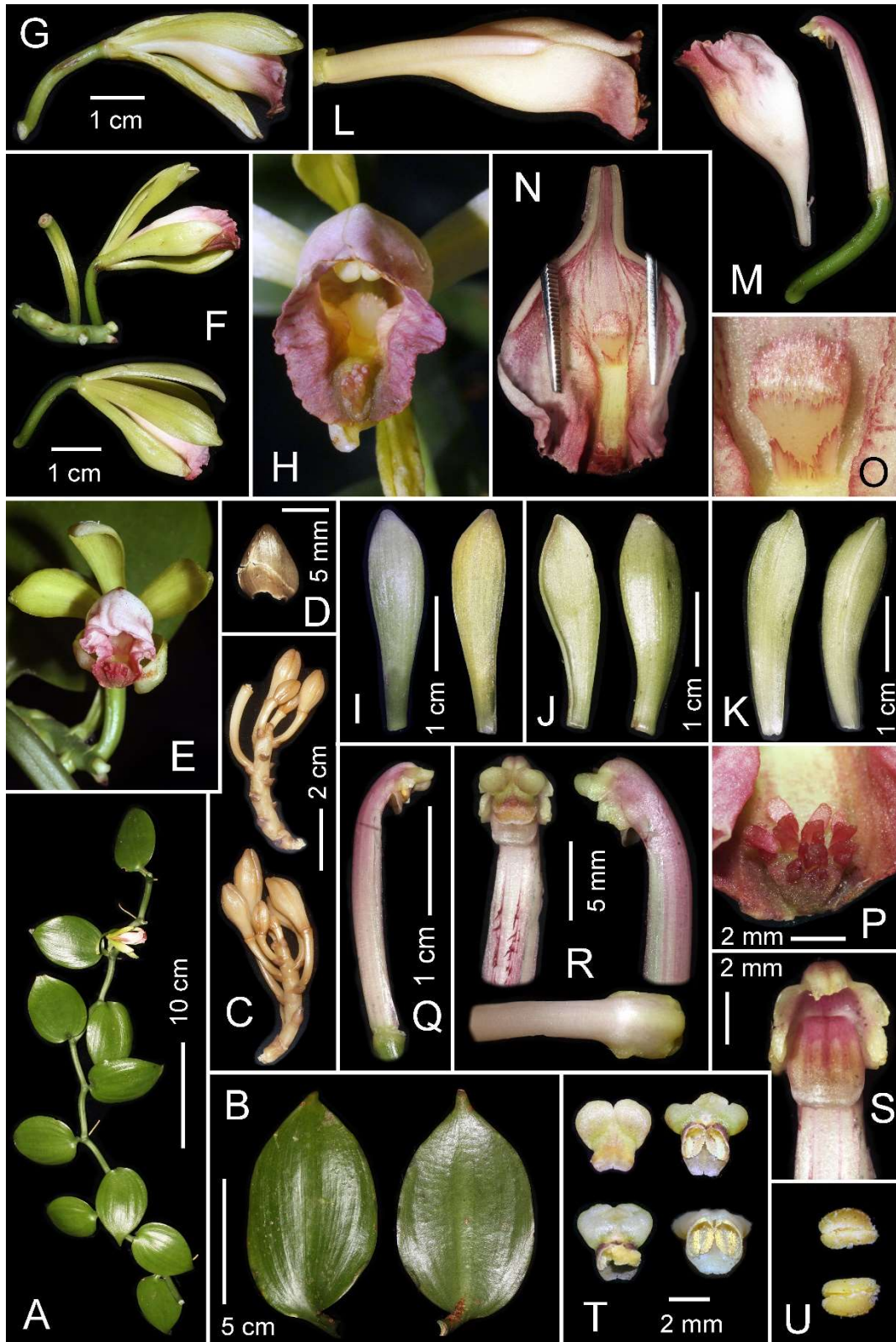
**Fig. 1.** *Vanilla tiendatii* **A.** Flowering plants in the wild **B.** plants in their natural habitat,. Photo by Bui Tien Dat.

*Ba Vuong, Bui Van Huong, BV 355* (holotype: VNM 00023882). Photos of living plant, flowers and floral parts prior to the preparation of the holotype: LE01073088 (<http://en.herbariumle.ru/?t=occ&id=15224>).

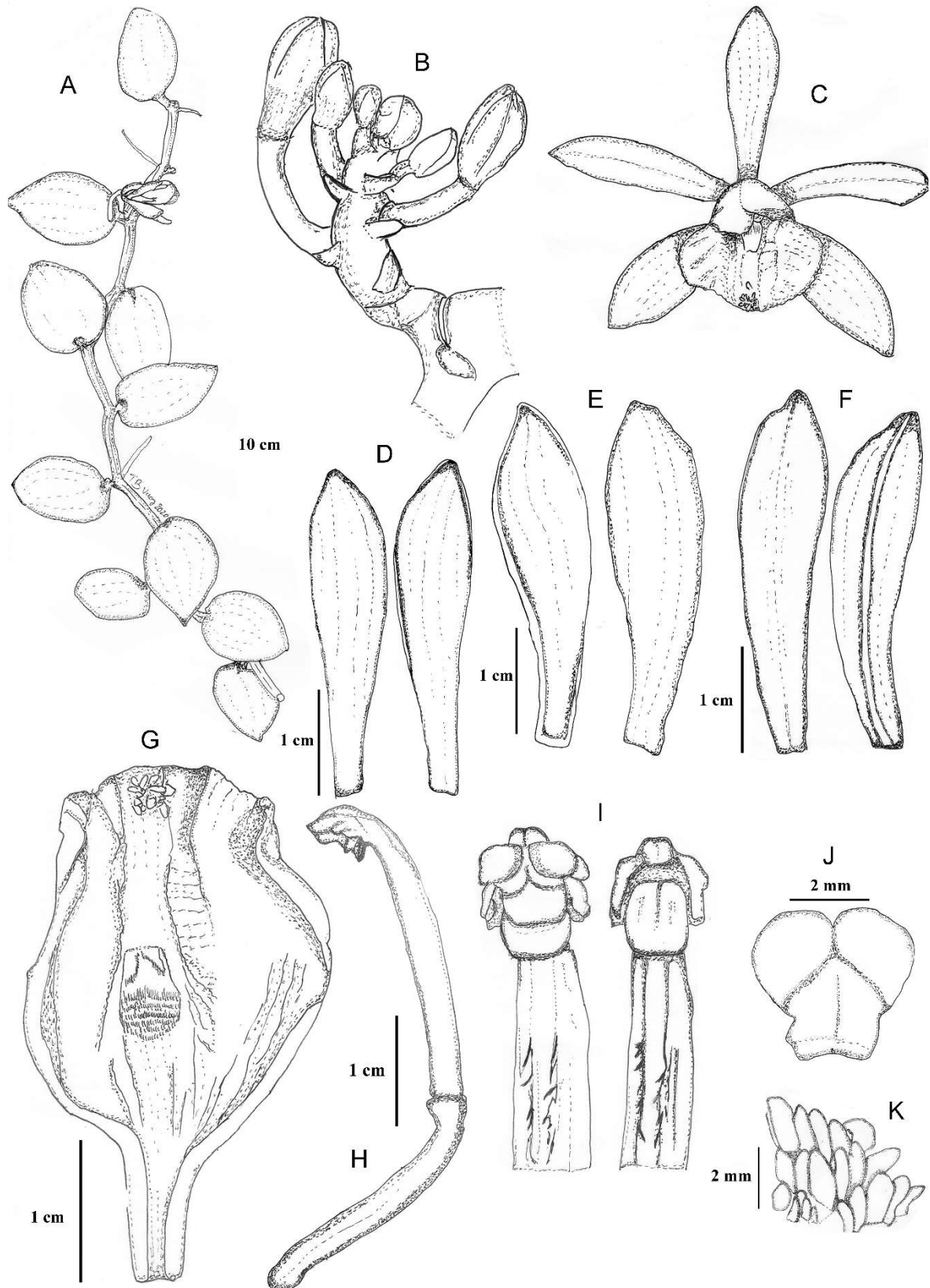
**Diagnosis.** *Vanilla tiendatii* looks similar to *V. yersiniana* but clearly differs in its ovate or broadly elliptic leaves, up to 9 cm long, 6 cm wide (vs. broadly lanceolate to narrowly ovate leaves, up to 14 cm long, 5 cm wide), lip apex with dense group of fat papillate hairs (vs. lip apex glabrous or with sparse papillate hairs), and lip apex pink or reddish (vs. lip apex white with greenish tint). The new species can be also compared with *V. albida*, which has not been recorded yet in Vietnam. It differs from *V. albida* in its greenish yellow sepals and petals, lip pink to white with pink tint (vs. green sepals and petals, lip pure white, fide Comber, 1990), leaves ovate to broadly elliptic (vs. leaves narrowly elliptic-oblong), sepals and petals 3–3.5 cm long (vs. sepals and petals 4–5 cm long, fide Comber, 1990 and Wood *et al.*, 2011), low callus running from the base of the scales tuft to the lip apex (vs. short rounded callus above the scales tuft extending to the lip apex), group of fat papillate hairs 1–2.5 mm long, ca. 0.5 mm wide on the lip apex (vs. sparse short hairs ca. 2 mm long on the lip apex, fide Suddee *et al.*, 2010).

**Description:** Lithophytic creeping vine. Stem simple or little branching, up to 7 m long, 5–8 mm in diameter; internode 3.5–4 cm long, roots ca. 1 mm in diameter. Leaves glossy green, ovate or broadly elliptic, 4–9 cm long, 4–6 cm wide, petiole ca. 1.5 cm long, apex shortly acuminate. Inflorescence axillary, 3.3–9 cm long, peduncle fleshy, 0.5–1.6 cm long, inflorescence bract 1 to 3, ovate to broadly ovate, 0.5–7 cm long, 0.3–8 cm wide, apex obtuse; rachis 1.5–3.3 cm long, with up to 13 flowers; pedicel and ovary green, terete, slightly curved, 2.8–3.2 cm long; floral bract broadly triangular, 2–5 mm long, 3–4 mm wide, apex truncate or rounded. Flowers open widely, in succession, sepals and petals yellowish-green, lip basally light pinkish, pink at apex, with pink red papillate hairs. Dorsal sepal broadly oblanceolate, ca. 3 cm long, 0.6 cm wide, obtuse; lateral sepals slightly broader, ca. 3.3 cm long, 0.8 cm wide, obtuse. Petals broadly oblanceolate, 3–3.5 cm long, 0.7–0.8 cm wide, acute, with abaxial keel along the median vein. Lip trumpet-shaped, entire, ca. 3.5 cm long, adnate to column margins for about 2.5 cm of its length; apical part of the lip rounded, slightly undulate to undulate; disc with dense tuft of many imbricate scarios, backward turned scales; the low callus from the base of scales tuft extends to the lip apex; the lip apex with a group of fat





**Fig. 2.** *Vanilla tiendatii*. **A.** Flowering plant; **B.** Leaf; **C.** Alcohol fixed inflorescences; **D.** Inflorescence bract; **E.** Flower, frontal view; **F** & **G.** Flowers, side views; **H.** Intact lip, frontal view; **I.** Dorsal sepal; **J.** Lateral sepals; **K.** Petals; **L.** Intact lip and column, side view; **M.** Lip and column separated, side view; **N.** Flattened lip, adaxial surface; **O.** Group of imbricate scarious bracts on the lip disk; **P.** Hairs on the lip apex; **Q.** Column, side view; **R.** Apical part of column, at different views; **S.** Front view of the column apex with pollinia removed; **T.** Anther cap with, and without pollinia; **U.** Pollinia. All photos by Truong Ba Vuong, correction of photos and design by L. Averyanov.



**Fig. 3.** *Vanilla tiendatii*. **A.** Flowering plant; **B.** Inflorescence; **C.** Flower, front view; **D.** Dorsal sepal; **E.** Lateral sepals; **F.** Petals; **G.** Lip; **H.** Column and pedicel; **I.** Column with anther cap (left) and without anther cap (right); **J.** Anther cap; **K.** Papillate hairs. Drawing from the type specimens by Truong Ba Vuong.



short papillate hairs, 1–2.5 mm long, ca. 0.5 mm wide. Column slender ca. 3 cm long, slightly curved, in middle with 2 lines of red hairs; lateral sides of clinandrium slightly undulate; rostellum rectangular, ca. 3 mm long; anther cap helmet shaped, glabrous, ca. 3 mm long, with 2 rounded lobes. Fruit not seen.

**Etymology:** The species is named after Mr. Bui Tien Dat, an orchid enthusiast who collected material used for the preparation of the type specimen.

**Habitat:** Found growing as a lithophytic creeping vine, in both open and shady rather dry limestone forest together with *Rhaphidophora* species.

**Phenology:** Flowers in April–May. In the nature plants flower only in full sunlight.

**Distribution:** Known from two locations in Quang Binh Province (Minh Hoa District, Trung Hoa and Yen Hoa communes).

**Proposed conservation status:** According to the presently available observations the new species is locally common but seriously disturbed by agriculture activities at foothills. More field studies are needed for determination of its current conservation status. Following the IUCN criteria (IUCN, 2019) it may be tentatively assessed at present as “Data Deficient” (DD).

**Notes:** The plant juice of this new species can cause allergies that manifest as strong skin itching.

**Additional specimens examined:** VIETNAM, Quang Binh Province, Minh Hoa District, Yen Hoa Commune, limestone mountain forest, elevation 300–400 m a.s.l., 28 April 2020, *Truong Ba Vuong, Dang Van Son, Bui Van Huong, BV 620* (VNM00023883!), *BV 621* (VNM00023888!); Same location, elevation 350 m a.s.l., 02 May 2020, *Truong Ba Vuong, Dang Van Son, Bui Van Huong, BV 829* (LE!).

#### Identification key to *Vanilla* species in Vietnam

- 1a. Plant without normal photosynthetic leaves ..... *V. aphylla*
- 1b. Plant with normal photosynthetic leaves ..... 2
- 2a. Inflorescence less than 4 cm long, with 6–13 flowers ..... 3
- 2b. Inflorescence about 14 cm long, with 18–23 flowers ..... 4
- 3a. Lip apex glabrous or sparsely papillose, column glabrous, apex without wings ..... *V. yersiniana*
- 3b. Lip apex with group of papillate hairs, column with 2 lines of stiff hairs, winged at apex ..... *V. tiendatii*
- 4a. Lip white, median lobe ovate, 1–1.5 cm long, 1.5–2 cm wide, with fat papillae more than 5–8 mm long; column hairy at apex ..... *V. siamensis*
- 4b. Lip white tinged with pale green, margin maroon, median lobe semi-orbicular, 1.3 cm long, 1.5 cm wide, with slender subulate hairs ca. 4 mm long; column glabrous ..... *V. atropogon*

## ACKNOWLEDGMENTS

Field and laboratory studies were funded and supported by Herbarium of Institute of Tropical Biology (ITB), Ho Chi Minh City, Vietnam and the Russian Foundation for Basic Researches “Inventory, taxonomy and geography of the orchids (Orchidaceae) of Vietnam”, 20-04-00339 A.

## LITERATURE CITED

- Averyanov, L.V.** 2011. The orchids of Vietnam illustrated survey. Part 3. Subfamily *Epidendroideae* (primitive tribes - *Neottieae*, *Vanilleae*, *Gastrodieae*, *Nervilieae*). *Turczaninowia* **14**(2): 15–100.
- Averyanov, L.V. and A.L. Averyanova.** 2003. Updated Checklist of the Orchids of Vietnam. Vietnam National University Publishing House. 101 pp.
- Averyanov, L.V. and B.V. Truong.** 2015. Review of the genus *Miguelia* (Orchidaceae) with a new species, *M. cruenta*, from southern Vietnam. *Taiwania* **60**(1): 33–38.
- Beentje, H.** 2012. The Kew Plant Glossary, an illustrated dictionary of plant terms (revised edition). Kew: Royal Botanic Gardens, Kew Publishing.
- Cameron, K.M.** 2011. *Vanilla* Orchids. Natural History and Cultivation. Timber Press. Portland & London. 212 pp.
- Comber, J. B.** 1990. Orchids of Java. Royal Botanic Gardens Kew. 407 pp.
- IUCN Standards and Petitions Subcommittee.** 2019. Guidelines for using the IUCN Red List categories and criteria ver. 14. <<https://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf>>, accessed 20 July 2020.
- Pridgeon, A., P.J. Cribb, M.W. Chase and F. N. Rasmussen.** (Eds.). 1999. Genera Orchidacearum Volume 3: Orchidoideae (Part 2) Vanilloideae (Vol. 3). Oxford University Press. 358 pp.
- Seidenfaden, G.** 1992. The orchids of Indochina. *Opera Botanica* **114**. 502 pp.
- Soto-Arenas, M.A. and P. Cribb.** 2010. A new infrageneric classification and synopsis of the genus *Vanilla* Plum. ex Mill. (Orchidaceae: Vanillinae). *Lankesteriana* **9**(3): 355–398.
- Suddee, S., S. Chantanaorrapint, P. Tripetch and S. Thainukul.** 2010. New records in Lecanorchis Blume and Vanilla Plum. ex Mill. from Thailand with keys to the Thai species. *Thai Forest Bulletin (Botany)* **38**: 1–7.
- Wood, J.J., T.E. Beaman, A. Lamb, C.C. Lun and J.H. Beaman.** 2011. The Orchids of Mount Kinabalu 2. Natural history publications (Borneo), Kota Kinabalu, Malaysia. 276 pp.